

**U.S. ARMY-BAYLOR UNIVERSITY GRADUATE PROGRAM IN
HEALTH CARE ADMINISTRATION**

**ANALYSIS OF WHY THE RENAL DIALYSIS UNIT IS
LOSING MONEY**

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ABSTRACT

As the 21st century rapidly approaches, health care in America is in a transition. National health care expenditures continue to rapidly increase and the problems encountered while trying to manage finances can be complex. Escalating health care costs have forced health care organizations, third party payers and governmental agencies to reassess the way they do business.

This study examined the Renal Dialysis product line at Sentara Hampton General Hospital (SHGH) located in Hampton, Virginia. Despite efforts to remain competitive by procuring "state of the art" equipment intended to decrease treatment times and result in cost savings, the renal dialysis product line was losing money. Management voiced concern that the dialysis product line had been losing money over the two previous fiscal years and wanted to know what factors were causing the steady decline of profit in that product line.

A case study was selected as the method to examine the dialysis product line because it provided a method that formed a complete picture of the different variables involved in providing a dialysis service. Performance was also analyzed using a "case mix" software program that extracted demographic, clinical and financial data about the dialysis product line.

The results of this study revealed that overhead costs had been erroneously assigned to the dialysis department, administrative errors had occurred with the billing process and lack of communication between "key" players accounted for most of the steady decline in financial performance in the renal dialysis product line. The recommendations from this study provided management with the insight for future cost controls and guidance to prevent reoccurrence.

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INTRODUCTION

Societal, legislative, competitive, and technological changes have forced the health care industry to face the same challenges as other sectors of American economy (Seay and Sigmond 1989). National health care spending grew more than 250 percent between 1980 and 1993, due to the financial environment in which health care services were delivered (U. S. Congress 1995). The problems encountered with financially managing the health care industry and its workforce can be complex. The problem becomes even more complicated when the supply and demand of health care are unpredictable variables. Factors influencing supply and demand in the health care industry can include the needs of the patients, production of professionals (i.e., physicians and support personnel), support systems (i.e., medical and allied health schools), rate of retirement, development of new drugs, new diseases, new technologies and growth of managed care (Schroeder 1994).

Escalating health care costs have forced health care organizations, third party payers and governmental agencies to reassess the way they do business. Third party payers, including Medicare, are reviewing reimbursement methodologies for supplies and services. As an example, Medicare implemented several payment policy changes in the 1980's that included the prospective

payment system. The prospective payment system reimburses health care facilities on a fixed payment system rather than a fee for service basis. This policy change slowed down expenditures for Medicare and made health care facilities shift costs (U. S. Congress 1995). Review of Dialysis Programs and re-engineering efforts are essential for third party payers and providers in this era of cost containment.

As third party payers continue to reevaluate and implement changes in health care reimbursement rates, health care facilities are reviewing the efficiency and effectiveness of the health care programs they are maintaining. Financial analysis, benchmarking and comparative analysis are tools available for Health Care Administrators to assess programs for viability and benefit. However, cost should not be the sole indicator for viability. Decisions may also be based on the health benefits provided to the community (Finkler 1994).

CONDITIONS WHICH PROMPTED THE STUDY

Sentara Hampton General Hospital (SHGH), located in Hampton, Virginia, is a not-for-profit community hospital and is considered a major health care provider in Southeast Virginia. Known originally as the Hampton Training School for Nurses and affectionately as the "Dixie Hospital," SHGH received its charter from the Virginia General Assembly in 1892. It became part of an integrated

health system known as the Sentara Health System in 1988. It is a 369-bed facility offering a full range of services that include, magnetic resonance imaging (MRI), cardiac catheterization, level II trauma services, Sentara Careplex Medical Center (a full-service outpatient and emergency treatment center), laser surgery, renal dialysis, complete birthing center, home health care, fitness center, cancer center and same day surgery center. SHGH employs more than 1,400 people and serves approximately 140,000 residents in the Hampton, Virginia area. Actively involved with promoting community wellness SHGH sponsors 30 free health education programs and a dozen free health screenings every year along with support groups and information services.

SHGH has a long history of servicing the Virginia Peninsula. However, the rapid expansion of the area and the increasingly attractive demographics of its populace has made the Peninsula the primary target for competitive institutions to improve their financial performances. The result, of course, has been intensifying competition for patient beds and patients. SHGH is continually seeking to improve services and manage various health care programs to remain afloat in a very competitive market.

In addition to providing a multitude of patient services, SHGH also operates a renal dialysis center that serves approximately 130 patients afflicted

with end stage renal disease. The renal dialysis center is physically located approximately eight miles from SHGH in a facility known as the Sentara Hope Medical Center. Although physically separated from the hospital, it is not considered a "free standing" or "independent" facility. Six dialysis units, Mary Immaculate Hospital, Riverside Hospital (two units), The Ren Center, Newport News General Hospital and Sentara Hope Medical Center provide dialysis care for patients on the Virginia Peninsula. The Sentara Hope Medical Center was originally an ambulatory care facility providing a wide variety of outpatient care to the residents of Hampton, Virginia but the influx of patients outgrew capabilities. In January 1995 a new facility called Sentara Careplex Medical Center (Careplex) opened providing outpatient care that was previously provided by the Hope Medical Center. The renal dialysis department remained in the Hope Medical Center and is currently the only SHGH program located in that building. The remainder of the building is occupied by the City of Hampton Health Department who is leasing office space.

In 1991 management decided to take steps to ensure the renal dialysis program kept pace with technology, remained competitive and satisfied the desires of staff Nephrologists by procuring nine High Flux Dialysis machines, patient entertainment equipment and an in-house water purification system. A financial

analysis was conducted to assess the feasibility of this project. The total cost of this project was \$153,130 and was considered an unbudgeted capital expenditure. The decision was made to pursue procurement of these items as an attempt to decrease staffing costs, increase patient comfort and decrease operating costs. These initiatives were implemented in fiscal year (FY) 1992. The fiscal year runs from 01 May through 30 April. Post acquisition review of the two-year period following purchase revealed financial gains due to an increase in the number of patients receiving treatment.

Following the two-year post acquisition period, the renal dialysis product line steadily demonstrated a decline in profit. Subsequently, fiscal year's 1995 and 1996 revealed a financial loss of approximately \$1.2 million and \$1.4 million respectfully, for the renal dialysis product line. The Chief Financial Officer and the department head of the Renal Dialysis Center raised concerns about the efficiency and effectiveness of this program. Their specific concerns were: (1) The product line has become an increased money loser over the past two years even though the volume of patients had steadily increased, (2) The high flux machines and water treatment system were purchased to reduce treatment time and reduce cost, not increase cost (3) The Full-Time Equivalents (FTE's) have increased, and is this increase appropriate for the increase in volume? (4) The allocation of overhead to

the renal dialysis product line may be inaccurate, and (5) If this product line keeps losing money would it be in the best interests of the hospital to discontinue this service or should the benefit to the community override monetary issues?

Currently, the renal dialysis department has 18 operational stations that use high flux dialyzers and provides care for approximately 104 patients on an outpatient basis (hemodialysis) and 25 patients in the home setting (peritoneal dialysis). The hours of operation are from 5:00 a.m. to 9:30 p.m. The department is staffed with approximately 25 personnel which is a combination of full time, part-time and as needed employees supporting three shifts of patients daily. Three physicians provide coverage on a rotational basis.

SHGH uses a computer software program that compiles case mix information as an analysis tool to judge the performance of the renal dialysis product line and various other product lines throughout the hospital. Case mix is defined as, "the number and proportions of cases or disease types treated in the hospital (The Hospital Research and Educational Trust 1985)." A product line is an adaptation of case mix data that groups patients and patient care services into categories relevant for management purposes, such as marketing and monitoring of resource consumption. Cleverly (1987) described product lines as, "an amalgamation of patients in a manner that makes sense."

Knowledge gained from case mix information, extracted from demographic, clinical and financial data, helps management to monitor financial performance, manage clinical resources, develop marketing strategies and plan new programs and services. Case mix is measured by various patient classification systems based on principal diagnosis, operative procedure, age, complications or other illnesses (comorbidities) and discharge status (The Hospital Research and Educational Trust 1985).

Case mix software helps SHGH categorize case mix data into product lines for management and marketing purposes. Data gathered in case mix allows SHGH to analyze data far beyond traditional hospital information system's capabilities of defining a hospital's product by numbers of admissions, procedures and patient days. Case mix merges clinical information on the types of patients treated with financial information on the hospital's costs and revenues and allows the hospital to measure and monitor the types of cases treated. For each product line the hospital can measure precisely the resources expended for patient care delivery, and costs and revenues by physician and type of payer. It can also produce information categorized by medical staff specialty, patient origin and demographics (The Hospital Research and Educational Trust 1985).

STATEMENT OF THE PROBLEM

Health care executives need to be knowledgeable regarding the efficiency and effectiveness of each health care product line in their organization. According to the Fiscal Officials at SHGH, the Dialysis product line has been losing money for the past two years. Health care executives at SHGH need to have the following question answered in order to make any type of informed decision on their Dialysis Program; "What are the factors causing the steady decline of profit in the renal dialysis product line?"

LITERATURE REVIEW

Dialysis

One of the most devastating disease processes is chronic kidney (renal) disease also known as End Stage Renal Disease (ESRD). ESRD is that stage of kidney failure which is irreversible, cannot be controlled by conservative management alone, and requires dialysis or kidney transplantation to maintain life (Greer 1992). Chronic renal failure is a slow, insidious and irreversible impairment of renal function. As compared with acute renal failure which is sudden in onset resulting in severe impairment of renal functions. The prognosis of acute renal

failure depends of the cause and the extent of the renal failure (Shoemaker, et al 1995).

Renal failure, acute or chronic, is characterized by the inability of the kidneys to excrete wastes, concentrate urine, and conserve or eliminate electrolytes (Christensen and Kockrow 1995). Chronic renal failure or ESRD exists when the kidneys are unable to regain normal function. Common causes of ESRD are pyelonephritis, chronic urinary obstruction, severe hypertension, diabetes mellitus, gout, and polycystic kidney disease. Patients with advanced chronic renal failure develop uremia, which is uniformly fatal if not treated by either renal transplant or renal dialysis. Regardless of the cause, the only options for these patients remains dialysis or kidney transplantation to maintain their life. The treatment for ESRD has changed from treating a terminally ill patient to dealing with a person who has a manageable chronic disease that requires long term care (Lewis and Collier 1992).

Dialysis mimics kidney function, helping to restore balance when normal kidney function is interrupted temporarily. Dialysis is a medical procedure performed to remove certain elements from the blood or lymph by diffusion through an external semi-permeable membrane (artificial filter) in hemodialysis or in the case of peritoneal dialysis through the peritoneum (Christensen and Kockrow 1995).

Hemodialysis requires access to the patient's circulatory system to route

blood through the artificial kidney for removal of wastes, fluids, and electrolytes and then returns the blood to the patient's body. This procedure is performed in a dialysis unit and typically is performed two to three times per week. This procedure is performed by nurses and dialysis technicians (Shoemaker, et al 1995).

Peritoneal dialysis requires a catheter to be placed in the patient's peritoneal space. Dialyzing fluid is instilled through the catheter into the peritoneal space for a predetermined period and then drained. This procedure must be performed four times per day seven days a week. It usually takes thirty to forty minutes to complete one exchange cycle (Christensen and Kockrow 1995). This procedure can be performed in the home setting and does not require the resources of hemodialysis. However, peritoneal dialysis is not ideal for every patient. Peritoneal dialysis does consume a fair amount of time and does require some cognitive and motor skills.

Currently in the U.S., there are about 200,000 individuals receiving dialysis at a cost of \$7 billion a year. Many tests are performed on uremic patients to monitor their clinical course and the success of dialysis. The tests are used to judge the adequacy of dialysis and the amount and type of dialysis for individual patients (Green 1994).

Laboratory Testing

Many laboratory tests are performed on patients with ESRD to monitor the adequacy of treatment. The kidneys, through the production and elimination of urine, maintain homeostasis or the normal functioning of the body. Specifically, the kidneys (1) help regulate the volume, electrolyte concentration, and acid-base balance of body fluids, (2) detoxify the blood and eliminate wastes, (3) regulate blood pressure, and (4) aide in erythropoiesis, the production of red blood cells (Springhouse Corporation 1995). In ESRD, dialysis takes the place of the kidney attempting to maintain homeostasis. However, dialysis only mimics the function of a kidney and cannot possibly perform these functions as efficiently as the kidneys. Therefore, it is very important to monitor laboratory values of the dialysis patient.

Potassium, phosphorus, and calcium serum levels are just a few laboratory values that need to be monitored in patients with ESRD. Potassium and phosphorus retention typically occurs in patients with chronic renal failure. An excess amount of potassium in the body, also termed hyperkalemia, occurs in chronic renal failure because of inadequate renal excretion. Patients with hyperkalemia can develop skeletal muscle paralysis, but the most dangerous effect of hyperkalemia is the effect it has on the heart. Hyperkalemia will demonstrate EKG changes and eventually lead to cardiac arrest (Merck Sharp & Dohme

Research Laboratories 1972).

As the kidney's begin to fail so does the kidney's ability to excrete phosphorus. An increase in serum phosphorus is known as hyperphosphatemia and usually is asymptomatic, requiring no treatment. However, a decrease in serum phosphorus leads to a decrease in calcium levels as well. This decrease in serum calcium (hypocalcemia) may cause hyperexcitability of nerves (tetany) in the renal patient. A decrease in calcium can also come from the diseased kidney's inability to activate vitamin D. In the absence of vitamin D there is poor absorption of calcium from the intestinal track (Black and Matassarini-Jacobs 1993). Serum potassium, phosphorus, and calcium levels can be altered in the renal patient and require monitoring.

Wastes are eliminated from the body through urine formation and excretion. The term glomerular filtration refers to the process of filtering blood flow through the kidneys. The normal glomerular filtration rate is 120 ml/minute (Springhouse Corporation 1995). The most accurate measure of the glomerular function is the creatine clearance. The blood urea nitrogen (BUN) is yet another value requiring monitoring for nitrogen retention in the renal patient.

Regulating blood pressure is a primary goal of the kidneys. Elevated blood pressure (hypertension) is often present in renal patients and its

frequency varies with the type of underlying renal disease (Phipps, Long, Woods, and Cassmeyer 1991). Elevated blood pressure can produce a variety of effects but a major concern is that hypertension and renal retention of sodium and water may lead to congestive heart failure in the renal patient.

Metabolic acidosis is yet another complication for renal patients. Chronic renal failure patients are unable to excrete hydrogen ions and manufacture bicarbonate by the kidney and this action causes what is known as metabolic acidosis. Metabolic acidosis is described as a fall in bicarbonate concentration and a reduction in pH and total carbon dioxide content (Merck Sharp & Dohme Research Laboratories 1972). Severe metabolic acidosis develops when the kidney fails to secrete sufficient hydrogen ions and ammonium ions which leads to a decline in tubular reabsorption and regeneration of bicarbonate (Black and Matassarini-Jacobs 1993). Acidosis may be asymptomatic but typically is accompanied by weakness, headache or malaise and sometimes by abdominal pain, nausea, and vomiting. Severe acidosis may cause circulatory shock and stupor with progression to a coma (Merck Sharp & Dohme Research Laboratories 1972).

Hormones aid in controlling water regulation by the kidney. The two hormones requiring close monitoring in ESRD patients are the antidiuretic

hormone (ADH) and aldosterone. ADH is produced by the pituitary gland and alters the collecting tubules' permeability to water. When plasma concentration of ADH is high a greater amount of water is reabsorbed. This creates a high concentration but small volume of urine. Aldosterone, which is produced by the adrenal cortex, regulates sodium and water reabsorption. High levels of aldosterone concentration promotes sodium and water reabsorption and decreases sodium and water excretion in the urine (Springhouse Corporation 1995).

The primary hematologic effect of renal failure is anemia, which is usually due to reduced erythropoiesis. Normal kidneys secrete erythropoietin in response to a decreased oxygen tension in the renal blood supply (Black and Matassarini-Jacobs 1993). Erythropoietin acts on the bone marrow and increases the production of red blood cells. However, in a diseased kidney erythropoietin is not produced and does not in turn produce red blood cells. It is therefore important to monitor the serum hematocrit level in patients with chronic renal disease (Springhouse Corporation 1995). The hematocrit measures the volume of red blood cells to a given volume of blood (Phipps, Long, Woods, and Cassmeyer 1991).

The basic goals of dialysis therapy are to: remove end products of protein metabolism, such as urea and creatine from the blood; maintain a safe

concentration of serum electrolytes; correct acidosis and replenish the bloods bicarbonate buffer system, and remove excess fluid from the blood (Black and Matassarin-Jacobs 1993). Dialysis can perform these functions but the health care team needs to continuously monitor laboratory values in order to assure these goals are achieved.

Medicare's End Stage Renal Dialysis Program and Reimbursement

The Medicare ESRD program was established in 1973 and provides benefits to any individual who has permanent loss of kidney function. Any individual who otherwise is eligible for Social Security benefits, is eligible for Medicare ESRD benefits. It is the only national health insurance program for a specific health condition in the United States (Farley 1994).

Medicare's ESRD program provided services for more than 135,000 patients in 1989. This equates to approximately 93 percent of all renal patients in the United States (U.S. Renal Data System Report 1991). In 1988, the dialysis portion of the Medicare program cost was in excess of \$3 billion, amounting to approximately 50 percent of total ESRD expenditures during this period (U. S. Department of Health and Human Services 1992).

In 1994 the Medicare ESRD program covered 92.3 percent of people who

needed dialysis because of kidney failure. Projections for 1997 estimate the total cost of the ESRD program to reach \$ 8.4 billion, covering more than 243,000 persons which equates to approximately a 4 percent share of all Medicare expenditures (Gardner 1997). On the average dialysis patients are among the most costly of Medicare's beneficiaries. The projection of roughly \$34,300 per patient in 1997 is more than six times what Medicare is projected to spend on the average patient (Gardner 1997). Medicare reimburses dialysis units for dialysis treatment using a formula based on accounting costs reported by a small sample of facilities. However, accounting methods may obscure the true economic costs of providing the different types of dialysis treatments such as hemodialysis, and peritoneal dialysis (Dor, et al 1992).

A fixed payment rate for a single composite service is set by Medicare for outpatient dialysis. First introduced in 1983, this "composite rate" paralleled the introduction of the Prospective Payment System (PPS) for hospitals. The rate is set by the Health Care Financing Administration (HCFA) and is adjusted by an adjustment factor based on a blend of the Bureau of Labor Statistics wage index and HCFA's hospital wage index (U. S. Department of Health and Human Services 1992). Under the composite rate system, a dialysis facility must furnish all necessary dialysis-related services, equipment, and supplies in exchange for a

fixed-fee, per-dialysis treatment (HCFA 1997).

Medicare's base payment rate for outpatient dialysis services has never been adjusted for the effects of inflation, productivity changes, or scientific and technological advancement on the costs of treating patients with ESRD. Congress has asked the Prospective Payment Assessment Commission to annually recommend an adjustment to Medicare's base payment rate. One component of this adjustment addresses the cost-increasing effects of technological change--the scientific and technological advances (S&TA) component (Ozminkowski 1995).

The S&TA component is intended to encourage dialysis facilities to adopt technologies that, when applied appropriately, enhance the quality of patient care, even though they may also increase cost (Ozminkowski, et al 1995). The S&TA adjustment is one example of how the composite rate payment system for outpatient dialysis services can be modified to provide appropriate incentives for producing high-quality care efficiently (Ozminkowski 1995).

The cost of the Medicare's ESRD Program has steadily increased since its inception in 1972, although the actual cost per patient has increased only 69 percent, which is less than half of the inflation rate. The reimbursement amount per dialysis has actually decreased from \$138 in 1974 to approximately \$54 in 1991 when measured in constant dollars (Hull 1992). A study was conducted that

indicates Medicare's reimbursement formula may be outdated, and further research could lead to the design of more rational payment rules (Dor et al 1992).

The cost of certain laboratory tests for ESRD patients performed by the facility's staff or an independent laboratory is included in Medicare's composite rate for reimbursement. These tests include either a hematocrit or hemoglobin test as well as clotting time tests incident to each dialysis treatment and routine diagnostic laboratory tests. Blood Urea Nitrogen (BUN), prothrombin time for patients on anti-coagulant therapy, and serum creatinine on a weekly basis. On a monthly basis alkaline phosphatase, serum bicarbonate (CO₂), serum complete blood count (CBC), lactic dehydrogenase, serum calcium serum phosphorus, total protein, serum albumin, serum chloride, serum glutamic oxaloacetic transaminase (SGOT) and serum potassium tests are covered. A limited number of diagnostic tests are separately reimbursable (HCFA 1997).

Varying Costs of Renal Dialysis Units

Costs per treatment vary significantly between hemodialysis facilities. Several studies have demonstrated that variation of practice style account for many of the differences in care of patients and associated care costs (Brook, et al., 1984; Wennberg, 1984; Wennberg and Gittelsohn, 1982).

A study reported by Jones (1992) analyzed treatment variation in 527 patients in four freestanding and three hospital-based facilities. Results indicated that patients receiving care in the hospital-based units received a more costly routine dialysis treatment as well as more intensive nursing care during the treatment process than did patients in freestanding units (Jones 1992). A problem with this study, however, is that it does not evaluate the quality of these programs nor does it evaluate/compare expected patient outcomes.

A study conducted by Dor et al (1992) used a multi product, statistical cost function approach to obtain cost estimates associated with hemodialysis and peritoneal dialysis. Results showed that the average cost and marginal cost of hemodialysis treatments were generally in line with current reimbursement rates, whereas the average and marginal costs of continuous ambulatory peritoneal dialysis (CAPD) treatments were below this rate (Dor, et al 1992).

Hospital-based dialysis units argue that they provide care for more complex and severely ill patient resulting in higher costs (Jones 1992). Freestanding or independent units counter that higher costs experienced by hospital-based units are a result of inefficient practices (Jones 1992). Research conducted by Eggers (1982) echoes this belief when he reported that hospital-based units might have a more complex case mix because they have lower survival rates, longer hospital

episodes, higher hospitalization rates, more diabetics, and more newly initiated patients (Eggers 1982). Medicare rates also appear to reflect this view when you compare the payment rates for the hospital based and the freestanding units. Medicare payment rates per treatment are higher for hospital-based units, however, there is no standard adjustment for possible case mix differences between the two types of units (HCFA 1997).

Decreases in Medicare reimbursement rates have led to concern among health care professionals. Many believe that the reduction of rates has led to a reduction in dialysis staff, reuse of supplies, and decreased staff time per patient. As a result, many dialysis centers treat two groups of patients during one shift instead of one, which may impinge on the quality of care and adequacy of supervision (Hull 1992).

Clinical Pathways

Protocols, clinical pathways and guidelines have been heralded by many as a panacea for the problems associated with the rising costs of health care and variations in clinical practice. In their paper entitled "*Guidelines and Protocols: A Chance To Take The Lead*," Antroubus and Brown examine definitions of guidelines and protocols and consider their use for the development of nursing

practice, improvement of patient care and introduction of greater clarity in the use of health care resources (Antrobus and Brown 1996).

While not new to the health care environment, clinical pathways have been used as a mechanism for implementing a managed care delivery system. They have been effective in highlighting lengths of stay, outcome variances, and system problems (Ayestas, et al 1995). Many hospitals using critical pathways have documented cost savings and length of stay decreases. Coupling case management and developing clinical pathways has resulted in a savings of \$3 million at Birmingham Baptist Medical Center Montclair in Birmingham, Alabama (Grant, Campbell and Gautney 1995).

Developing their own clinical pathways for hospitalized chronic renal failure patients at Miller-Dwan Medical Center in Duluth, Minnesota resulted in a reduced average length of stay and cost of hospitalization drop from 13 days and \$12,020 to 10 days and \$10,562 over just a six month period (Bodin 1995). Similarly, a six-month case management program at Thomas Jefferson University Hospitals in Philadelphia developed for congestive heart failure patients realized a savings of an average of \$2,300 per case and decreased length of stay from 7.1 days to 4.5 days (Jungkind and Shaffer 1996).

Clinical pathways are important to health care providers because they

provide the means to monitor and improve quality and control costs. Displaying goals for patients and providing the corresponding ideal sequence and timing of staff actions aid in obtaining optimal efficiency. Monitoring variation from the clinical pathway allows health care providers to reduce variation which will ultimately improve quality and decrease costs (Pearson, et al 1995).

Serious concerns have been raised about the effect clinical pathways have on patient outcomes and satisfaction with care, physician autonomy, malpractice risks and the teaching mission of many hospitals. Many physicians also view their use as another manifestation of "cookbook" medicine (Pearson, et al 1995).

Community Good/Ethics

Dialysis treatment is an expensive proposition that benefits relatively few individuals. The financing of such care raises difficult issues of medicine, ethics, and policy (Rettig 1996). A broad approach should be used when viewing societal norms, ethics and economics in relation to treatment decisions for ESRD patients. Quality of life, cost/benefit and prevention are issues that should be considered (Cummings 1993).

Cost-control efforts when dealing with dialysis programs have squeezed dialysis facilities tremendously. As a result, highly trained staff such as nurses are being replaced by less well-trained personnel at a lower cost (Rettig 1996). This

coupled with a trend toward shorter dialysis times may result in inadequate dialysis treatment (Hull 1992).

Who should decide the benefit of providing dialysis treatment? Should federal, state, local officials or the hospital board decide? In Oregon, the legislature prioritized health care services when faced with the decision on how best to spend \$100,000. It could provide maternity care for 1,500 women or 1 bone marrow transplant. The decision was to provide care to the 1,500 women (Minuth 1992). Cost containment may be considered integral to the ESRD social contract. The most effective means of controlling costs would be to slow the increase of patient population (Rettig 1996). The solution may require a team effort involving the education of government and community leaders, health care providers and the patient.

The current debate in our health care system has focused primarily on the cost of care. Because of drastically rising costs and their burden on our economy, government and the private sector have developed many approaches to reduce these costs. Managed care, special contracting arrangements, and government fiat have all been used to stem the tide of rising costs---with variable success. Denton and Diamond (1995) advocate that the primary goal of health care should be the provision of patient benefit. They conducted a study with patients undergoing

coronary angiography and created a model that calculates an expected benefit in terms of survival and quality of life. Furthermore, they propose using a reimbursement strategy that relates the expected therapeutic benefit to the reimbursement received for that therapy--the greater the benefit, the greater the reimbursement. They propose that the future of our health care system lies in keeping the patient at the center of the debate on the delicate balance between optimal care and societal cost (Denton and Diamond 1995).

FUTURE

HCFA is working to improve the treatment of patients with ESRD. By use of ESRD Networks HCFA has developed ESRD Health Care Quality Improvement Program (HCQIP) that uses statistical evaluation of the processes and outcomes of care in dialysis populations, communicating recommended practices with clinical guidelines, regional peer review, interventions that focus on the provision of assistance for quality improvement efforts, continuing collection and active feedback of data to providers and a commitment to continue to evaluate and revise quality improvement activities to reflect lessons learned and newly identified needs (McClellan, et al 1995).

In 1990, only 8 percent of more than sixty million Medicare and Medicaid

recipients were enrolled in prepaid health plans (Goldsmith, Goran and Nackel 1995). What will happen when the entire U.S. population is enrolled in some type of managed care program? A trend that is becoming apparent in the nineties may be an indication of what the future holds. Managed care hospitalization rates rose more than 10 percent in the early nineties as a result of more plans adding more elderly and high-risk enrollees (Goldsmith, Goran and Nackel 1995). If managed care plans are forced to enroll high-risk members such as ESRD patients, the cost of plans will definitely rise. A high number of physician services and inpatient admissions will likely be priced at or below cost due to the discount for these services, negotiated by managed care buyers and hospitals, will intensify the development of the continuum of care of elderly services (Coile 1990).

Health care futurist Russell C. Coile, Jr. feels that the next frontier of health care cost containment is managing the process and cost of medical care, in essence total care management. A growing number of hospitals are expected to employ the tools of Total Quality Management, using them to manage medical care through the creation of care maps, protocols, algorithms, and clinical pathways. A trend that is becoming apparent in the nineties may be an indication of what the future holds. Coile predicts that variation in medical practice for hospital-based care will be substantially eliminated by the year 2000 (Coile 1990).

HCFA is planning to explore the possibility of enrolling patients with ESRD into prepaid risk plans in hopes of reducing costs by managing care. Four demonstration contracts are being negotiated over a four-year time period to evaluate potential cost savings. Currently, Medicare Health Maintenance Organizations (HMOs) are providing dialysis and other care for approximately 6,000 enrollees whose kidneys failed after becoming members. One purpose of the demonstration projects is to show that managed care can prevent hospital admissions and other common kidney treatment problems (Eggers 1996).

In the near future new methods to treat patients with ESRD may be employed. An attractive alternative to contemporary uremia therapy is the use of the intestine as a giant substitute and somewhat displaced nephron. Possible methods of extracting wastes via the gut include ingestion of a mixed oral sorbent, instillation of bacterial crystallized enzymes to transform nitrogenous wastes to essential amino acids, or administration of high osmolality laxatives to promote diarrhea containing nitrogenous wastes (Friedman 1995).

PURPOSE OF THE STUDY

The purpose of this research project was to identify factors causing the Dialysis Unit to be losing money for the past two years and to answer the

questions, Why is the Dialysis Unit losing money? And How can we make the dialysis program more cost effective? The Dialysis Unit was evaluated along with a variety of available data to determine possible causes for the loss in revenue. The researcher attempted to find causes and identify solutions, however, several areas were identified that will require further research.

METHODOLOGY

A case study was performed on the Dialysis Unit to answer the question Why was the Dialysis Unit losing money and identify areas for improved efficiency. The General Accounting Office defines a case study as, "a method for learning about a complex instance, based on a comprehensive understanding of that instance obtained by extensive description and analysis of that instance taken as a whole and in its context" (U. S. GAO 1990). Case studies fall into the category of exploratory studies. Examples of other exploratory studies are surveys, historical studies, ethnographic studies, and archival analysis (Bailey 1991). Case studies place an emphasis on detail providing valuable insight for problem solving, evaluation and strategy (Cooper and Emory 1995). Detail is secured from multiple sources of information and it allows evidence to be verified and avoids missing data (Cooper and Emory 1995).

The case study design was selected because this approach best answers the questions of how and why. Obtaining a complete picture of what is going on in an instance and why is the primary goal of a case study (U. S. GAO 1990). The questions, Why has the Dialysis Unit been losing money? and How can we make the Dialysis more cost effective?, needed to be addressed in this case study. A case study is longitudinal, performed over a specific period of time, and the time frame for this study was from 01 May 1995 to April 1997. The case study took on a life of its own as the exploratory process began. The case study began with informal interviews with the Fiscal Officer, Decision Support personnel (fiscal support), billing and coding personnel and the management and staff of the Dialysis Unit. Since the case study methodology is an exploratory process, the validity of the methodology may be questioned. Two tactics for achieving validity in this case study were used: multiple sources of evidence and using the chain-of-evidence technique in data reduction (U.S. GAO 1990).

In order to verify the exploratory process, data was used whenever possible to validate identified cost issues. The data analyzed for this case study came from available data. The advantages to using this type of data is first the economics associated with not developing and collecting new data (i.e., time and cost) and secondly it allows the researcher to follow trends because most official records

have been collected over time (Brink and Wood, 1994). The available data analyzed in the case study of the Dialysis Unit included financial records, billing records, staffing records, case-mix data and reimbursement rates.

Case mix data was analyzed to identify why the dialysis unit was losing money, identify cost savings, and determine the community good. An analysis was performed on how the Dialysis Unit was billing Medicare to identify if they were billing Medicare for all appropriate charges. The financial records were reviewed to see how the capital of the building was being assessed to the Dialysis Unit and to determine if it was being assessed to the Dialysis Unit appropriately.

Ethical Considerations

Since the data used in this project was not associated with individual patients or employees, SHGH did not require the use of consent forms. This case study was discussed with the administration of the facility and the Hospital Administrator approved the study.

Limitations and Validity of Case Study and the use of Available Data

Case study research has been criticized citing the ill effects of researched biased views that may influence the direction of the findings (Bailey 1991). Since I was not specifically vested in this medical facility nor the Dialysis Unit, I did not have a predetermined agenda or biases that will affect the validity of this study.

Case study research has also been criticized for its subjectivity and nonsystematic design (Cooper and Emory 1995). The data was analyzed in a way that was systematic and compared with specific measures of other institutions and agencies. These mechanisms decreased subjectivity and validated identified cost saving issues.

Another concern may be the criticism of using available data. The major drawback in using available data is that no matter how the data was collected it was not collected specifically for this project (Brink and Wood 1994). Specifically, there is no way to tell if the records were collected or saved in a biased manner, therefore, the researcher makes the appropriate conclusions as to the accuracy of the data (Wood and Haber 1994). Despite these arguments, it was necessary to obtain information from available data in order to identify cost savings initiatives. A review of the available data allowed the researcher to identify what was causing the Dialysis Unit to be a money loser and then the researcher was able to make recommendations for cost efficiencies.

PROCEDURES

The method to identify and document the causes of revenue loss affecting the dialysis product line began with interviews of the "key players." The project

started with an initial interview with the Chief Financial Officer (CFO) and the department head of the Dialysis Unit. Personnel involved with the dialysis process were narrowed to three groups, clinical staff, coding personnel and billing personnel. The supervisor or primary person actually responsible for each area was interviewed and questioned as to their role in the dialysis process. Initial and follow-up interviews were conducted between October 1996 and May 1997.

Interviews

Interview with the CFO and the Dialysis Unit Department Head

The initial interview with the CFO and Dialysis Unit department head identified several areas of concern. The accuracy of the financial reports were questioned and were suspected of being erroneously reported. Coding and billing procedures were also areas that the CFO wanted investigated. A total review of the entire dialysis process was deemed necessary by the researcher. The Dialysis Unit department head provided a copy of an Outpatient Dialysis Financial Analysis Proposal dated January 1991, a copy of a Plan Of Action dated March 1995 and an audit conducted by a commercial billing company dated June 1996. These reports were given to the researcher for evaluation and analysis. Use of case mix data was suggested by the CFO for financial analysis.

Interview with the Clinical Supervisor of the Dialysis Unit

The clinical supervisor of the Dialysis Unit provided a detailed historical background for the previous two year period (1994-1996). A review of the entire treatment process was provided as well as a tour of the Dialysis Unit with an explanation of each step of the treatment process for the "typical" ESRD patient. A broad overview of Medicare's ESRD Program and reimbursement policies was also provided. At the time of the interview, the Dialysis Unit was providing treatment to 104 outpatients who received three four-hour treatments per week.

Accurate FY 92 - FY 94 financial data was unavailable making it impossible to fully analyze the effect the purchase of high flux machines had on the Dialysis Unit product line. Purchase of the in-house water purification system alleviated problems with quality and cost issues associated with procuring water from commercial sources. Another figure requiring investigation was the ratio of Medicare patients. The clinical supervisor related that approximately 85 percent of the patients receiving treatment from the Dialysis Unit were covered by Medicare.

The clinical supervisor of the Dialysis Unit related that numerous issues had been identified as problems in March 1995 and a Plan of Action had been formulated to track progress. Eight significant problems had been identified with

suggested remedies. As of October 1996, five of the problems identified were still ongoing. Table 1 provides the Plan of Action formulated by the Dialysis supervisor and status as of October 1996.

Table 1, SHGH Renal Dialysis Product Line Plan of Action (March 1995)		
Problem	Suggested Remedy	Status as of 10/96
Inaccurate capture of charges for dialysis & dialysis services.	Assign full-time secretary solely responsible for inputting of charges and treatments.	Done
Inappropriate charges or lack of charges for some laboratory tests (I.e., blood urea nitrogen (BUN) & Hemoglobin.	Alert laboratory for possible use of lab slips for tests not covered by Medicare composite rate.	Ongoing
Patients require hematocrit & hemoglobin testing twice a month. Medicare only pays for one. Laboratory losing revenue. Laboratory does not want dialysis staff to use a Hemacue.	Suggest use of Hemacue for testing. Could be performed by dialysis staff and is less costly.	Ongoing
Pricing for dialysis supplies.	Combine usage across Sentara system. Solicit competitive bids.	Done
Multiple types of dialysis being ordered by Nephrologists resulting in increased costs.	Coordinate with Nephrologists the possibility of tailoring use of one basic product that has equal capabilities of current product in use.	Ongoing
All patients currently require 4 hours (minimum) to dialyze. If there are 2 shifts of patients, staffing is already into an overtime situation.	Dialysis equipment needs to be updated to fully utilize high efficiency dialysis.	Ongoing

Table 1, SHGH Renal Dialysis Product Line Plan of Action (March 1995)		
Dialysis flow sheets used do not have a carbon or second copy therefore dialysis record can only be placed on in-house chart. If record needs to be reviewed, there is no written record in dialysis chart.	Recommend using flow sheets with carbon copy.	Ordered
Patients progress not being reviewed by entire team (i.e., dietician, social worker, nephrologist, nursing staff, administrative staff.	Recommend monthly team review.	Ongoing

Interview with the Clinical Secretary

An interview with the clinical secretary (clinical associate) of the Dialysis Unit was also conducted. This person is responsible for documenting every treatment by transcribing information from a nursing flow sheet, a grid sheet and a charge sheet provided by clinical nursing staff. Since the nursing flow sheet is required to remain with a patient's chart, treatment information is usually transcribed from the grid sheet that nursing staff fills out. After the secretary transcribes this information, she inputs the data into two computerized data bases called Medipac and TDS. The Medipac system is used by Sentara for recording medical record and billing information. The TDS system records information concerning admission information. Information from these two data bases must be processed by coding and billing personnel to submit claims for reimbursement.

While the emphasis is for the secretary to input all treatment data, she must

be aware of special guidelines the various insurers require for reimbursement of claims. The majority of claims (approximately 85%) processed for the Dialysis Unit are for Medicare reimbursement. Medicare provides a defined set of requirements that must be met for reimbursement of services rendered to ESRD patients. Procedures, drugs and laboratory tests not covered by the composite rate are separately billable and must have a justification submitted with each claim for reimbursement. The secretary is responsible for ensuring that justification is provided for each patient care service not covered by the composite rate.

Procedures not normally covered by the composite rate are usually incurred by patients who have other disease processes (comorbid diseases) or physical problems in addition to or not related to ESRD. All procedures, laboratory tests and drugs ordered for the dialysis patients are entered into the Medipac system by the secretary as ESRD related. A monthly report is submitted to the patient billing department detailing the treatments rendered throughout the month to all dialysis patients.

Another item not covered by Medicare's composite rate is the drug, epogen (Epoetin Alfa). It is the most frequently used drug by patients undergoing dialysis treatment at the Dialysis Unit. Since it is not covered by Medicare's composite rate, it must be billed separately for reimbursement. Medicare requires

that a patient's hematocrit reading be below 36 to justify the use of epogen. Medicare reimbursement only occurs if the justification submitted with the claim denotes the required hematocrit reading. The secretary is the person responsible for ensuring that the proper documentation is submitted with each epogen claim. The secretary related that a significant number of claims for epogen were being denied because the hematocrit level was above the minimal standard reading of 36. This was caused by simple error (overlooked), failing to get a change of order from the physician and the scheduling of laboratory tests not coinciding with administration of epogen.

Due to the cost of epogen, denial of Medicare claims can lead to substantial financial losses. Epogen costs SHGH approximately \$2.90 per 100 units (\$29.00 per 1000 units) and the typical treatment per patient requires between 2,000 - 10,000 units of epogen. This equates to approximately \$58 - \$290 per dialysis treatment. Currently, Medicare reimburses the use of epogen at the rate of \$10 per 1,000 units (effective 1994). The rate of epogen reimbursement is set by law. Therefore, Medicare's reimbursement is approximately \$20-\$100 per dialysis treatment compared to SHGH's cost of \$58-\$290 per treatment. Although any amount of reimbursement is better than none at all, SHGH loses money on epogen administration even with reimbursement. These

fiscal losses need to be incorporated in the Dialysis Unit's fiscal projections.

A significant number of Medicare claims for laboratory tests were being denied because of incorrect diagnosis or coding. The clinical secretary blamed the use of recurring patient accounts for the problem.

Interview with the Coding Technician

The coding technician is solely responsible for coding all services rendered to Dialysis Unit patients. The technician was interviewed to investigate the coding process. The Dialysis Unit is located in the Hope Medical Center, while the coding department is located in SHGH. The coding technician receives a "thin" copy of the patient's record from the Dialysis Unit describing the patient's dialysis treatment. The coder then assigns each treatment an International Classification of Diseases (ICD 9) code and enters the information into the Medipac system. The majority of dialysis procedures are assigned an ICD 9 code of 585, which is the code that covers a single dialysis treatment. The coding department posts coding information on a daily basis and downloads this information to the patient billing department on the sixth day of every month.

Interview with the Billing Technician

The patient billing technician was interviewed to obtain an understanding of the billing process. The technician downloads coding information from the

Medipac system directly onto a UB-92 Form. This is the standard billing form that is submitted to Medicare for reimbursement. The technician also compares information on the UB-92 Form with information provided on a monthly report received from the Dialysis Unit. Separate Medicare claims (including justifications) are submitted for procedures drugs and/or, laboratory tests not considered part of Medicare's composite reimbursement rate. The UB-92 Form is then electronically transmitted to Blue Cross, Blue Shield offices and to HCFA for Medicare and Medicaid patients. The remainder of the claims are mailed.

Financial Analysis

Financial analysis was accomplished by reviewing case-mix data for fiscal year's (FY's) 1995, 1996 and 1997. Comparison data between hospital, direct and fully allocated costs were extracted from case-mix information. Direct cost represents all expenses and overhead directly related to the dialysis cost center and includes departmental depreciation. Hospital cost represents direct cost plus hospital overhead (i.e., laundry/linen, dietary, utilities, administrative staff). Full cost represents fully allocated cost including direct cost, plus hospital overhead, plus corporate overhead (i.e., information support, finance, corporate executives). Total number of cases, total charges, total reimbursement, total cost and total

margin were areas identified for comparison.

Financial data was also extracted from monthly departmental revenue and expense statements. These statements provide total revenue and total operating expenses which include salaries, purchased labor, employee benefits, professional fees, supplies, equipment depreciation and miscellaneous expenses.

Additional financial data was provided by the corporate finance office for analysis. Since SHGH is part of an integrated system, some financial data is collected and processed at the corporate level. Information such as contractual adjustment amounts, billing write-offs, overhead computation and bad debt and charity amounts were obtained from the corporate finance office.

RESULTS

Interviews yielded four areas requiring investigation for possible losses of revenue in the dialysis product line. The four areas included professional factors such as (1) physicians' practice (i.e., number of dialysis treatments per week, excessive use of ancillary services), (2) productivity factors (i.e., how efficiently dialysis treatments were given, (3) patient factors (i.e., type of patient population) and (4) procedural factors (i.e., coding or billing errors).

Physician Practice

Interviews and analyses demonstrated that epogen was being administered to patients even when the patient's hematocrit was not below Medicare's reimbursable rule of below 36. Reasons for this included the timing of ordering laboratory tests, the Medicare limit of hematocrit's per month (two) and routine ordering of these tests by physician's in anticipation of need. A standard of practice needs to be established and physicians need to follow the predetermined protocol. Further research needs to be performed on the standard of care and critical pathways need to be implemented in the Dialysis Unit.

Productivity Factors

Review of the Sentara Hope Medical Center Outpatient Dialysis Plan dated January 1991 projected a five-year profit margin of \$2,638,534 as the result of purchasing nine High Flux Dialysis machines. These machines were purchased with the intent to improve the overall efficiency of the Dialysis Unit by reducing the number of dialysis treatments required for a patient from three times a week to only twice a week. Predictions of increased efficiency coupled with an anticipated savings of approximately \$314,000 in salary costs during first two years of operation, provided further justification for the purchase of the machines.

The machines were purchased and placed in operation but predictions of capabilities to reduce patient treatments from three times per week to two times per week have never been realized. Treatment time required to dialyze the typical ESRD patient is approximately four hours and still requires three treatments per week. Accurate FY 92 - FY 94 financial data was unavailable making it impossible to fully analyze the effect the purchase of high flux machines had on the Dialysis Unit product line.

Despite the loss of anticipated revenue, the high flux machines have provided dialysis patients with standards of care consistent with the community and have been successful in making patients feel better and quite possibly healthier. Financial projections based on the predicted reduced treatment requirements are listed in Table 2.

Table 2, SHGH Renal Dialysis Product Line -Five Year Projections Dated: (February 1991)						
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
Total Procedures	8,921	9,099	9,281	9,467	9,656	46,423
Total Charges	1,784,108	1,819,790	1,856,186	1,893,310	1,931,176	9,284,571
Less Contractual Adjustments	356,822	363,958	371,237	378,662	386,235	1,856,914
Revenue	1,427,287	1,455,832	1,484,949	1,514,648	1,544,941	7,427,656
Variable Costs						

Table 2, SHGH Renal Dialysis Product Line -Five Year Projections Dated: (February 1991)						
Salaries	286,069	308,954	333,671	360,364	389,193	1,678,251
Supplies	467,153	490,511	515,036	540,788	567,828	2,581,316
TOTAL	753,222	799,465	848,707	901,152	957,021	4,259,568
Fixed Costs						
Lease	0	0	0	0	0	0
Salaries	54,889	59,280	64,023	69,144	74,676	322,012
Medical Director	0	0	0	0	0	0
Supplies	19,560	20,538	21,565	22,643	23,775	108,081
TOTAL	74,449	79,818	85,587	91,787	98,451	430,093
Depreciation	0	0	0	0	0	0
Maintenance	18,000	18,900	19,845	20,837	21,879	99,461
Total Expenses	845,671	898,183	954,139	1,013,777	1,077,351	4,789,122
PROFIT MARGIN	581,616	557,649	530,809	500,871	467,590	2,638,534

Despite the loss of anticipated revenue and the cost of the equipment, the High Flux Dialysis Machines are the standard of care, therefore, the purchase of this equipment was still a prudent decision.

Patient Factors

Interview with the supervisor of the Dialysis Unit revealed the current Hope Medical Center's charge for a single dialysis treatment is \$150 and the Medicare reimbursement rate is \$123.16. The difference of \$26.84 for each

treatment is considered a "contractual adjustment." The Medicare reimbursement rate for a dialysis treatment has not changed over the previous three years.

Approximately 85 percent of the dialysis patients who received care at the Hope Medical Center are covered by Medicare. Table 3 provides financial class description by payer.

Table 3, SHGH Renal Dialysis Product Line - Financial Class Description by Payer (FY 1995 - FY 1997)					
FY 1997		FY 1996		FY 1995	
Financial Class Description	Cases	Financial Class Description	Cases	Financial Class Description	Cases
Medicare A & B- or A only	447 (82%)	Medicare A & B or A only	480 (87%)	Medicare A & B or A only	554 (85%)
Key care- Blue Cross- PPO	31 (5.6%)	Keycare-Blue Cross	14 (2.5%)	Blue Cross - VA	15 (2.3%)
Medicaid of VA	16 (2.9%)	Blue Cross - VA	11 (2.0%)	Newport News Shipyards	14 (2.1%)
Medicaid HMO	9 (1.6%)	Commercial	7 (1.2%)	Medicaid of VA	12 (1.8%)
Blue Cross of VA	8 (1.4%)	Cigna -Prev. Equicor	6 (1.0%)	Commercial	11 (1.7%)
Cigna-Prev. Equicor	6 (1.1%)	Medicaid of VA	6 (1.0%)	Keycare- Blue Cross-PPO	11 (1.7%)
Self Pay	6 (1.1%)	Sentara Health Plan	5 (.9%)	Sentara Health Plan	11 (1.7%)
Sentara Medicare Choice	5 (.9%)	Direct Contracts	4 (.7%)	Direct Contracts	6 (.9%)
Commercial	4 (.7%)	Optima	4 (.7%)	Sentara Medicare Choice	6 (.9%)
Champus	3 (.5%)	Sentara Medicare Choice	4 (.7%)	Medicaid-other	4 (.6%)

Table 3, SHGH Renal Dialysis Product Line - Financial Class Description by Payer (FY 1995 - FY 1997)

Partners Preferred PPO	3 (.5%)	Medicaid HMO	3 (.6%)	Self Pay	4 (.6%)
Sentara Health Plan	3 (.5%)	Self Pay	3 (.6%)	Cigna-Prev Equicor	1 (.1%)
Optima	2 (.3%)	Newport News Shipyard	2 (.3%)	Welfare	1 (.1%)
Direct Contracts	1 (.3%)	Partners Preferred PPO	1 (.1%)	-----	-----
Welfare	1 (.3%)	-----	-----	-----	-----
TOTAL	545		550		650

When taking into account the difference from SHGH's cost to the payment for the Medicare population, SHGH will have an expected financial deficit of \$11,997 (447 treatments times a loss of \$26.84 per treatment) for FY's 96-97.

Procedural Factors

Allocation of overhead was reviewed as part of the financial analysis. The Careplex Medical Center opened in January 1995 and all work centers previously located in the Hope Medical Center moved into the new facility with the exception of the Dialysis Unit. Review of cost center allocation for overhead revealed that overhead was not adjusted after the move so the Dialysis Unit cost center was charged overhead for the entire Hope Medical Center as well as overhead for several work centers located at the Careplex outpatient facility. Table 4 provides a

list of cost centers with overhead allocated to the Dialysis Unit in July 1996. The allocation error was discovered during a review of allocation distribution. Cost centers annotated as deleted were assigned to Careplex effective November 1996 and overhead cost allocation was adjusted by the corporate finance department for FY 96 and FY 97 at that time. Overhead cost allocation was not adjusted for FY 95.

After calculating revised overhead allocation, it was determined that approximately \$650,000 had been erroneously assigned to the Dialysis Unit for FY 96. With these new figures the Dialysis product line did not lose as much revenue as initially anticipated.

Table 4, SHGH Hope Center Renal Dialysis Product Line Cost Allocation (Overhead) As of July 1996			
Cost Center #	Name	Classification	Group
4760	Hope Bad Debt Allowance Account	Hosp Overhead	HOPE
4800	Bad Debt Allowance Account	Hosp Overhead	HOPE
5100	HOPE Administration & General	Direct Overhead	HOPE
5175 Deleted (11/96)	HOPE I/O Surgery	Revenue Producing	HOPE
5177 Deleted 11/96	HOPE Lithotripter	Revenue Producing	HOPE
5180 Deleted (11/96)	HOPE Emergency Room	Revenue Producing	HOPE
5190	HOPE Renal Dialysis	Revenue Producing	HOPE

Table 4, SHGH Hope Center Renal Dialysis Product Line Cost Allocation (Overhead) As of July 1996			
5191	HOPE Acute Renal Dialysis	Revenue Producing	HOPE
5192	HOPE CAPD	Revenue Producing	HOPE
5200 Deleted (11/96)	HOPE Lab	Revenue Producing	HOPE
5210 Deleted (11/96)	HOPE Ultrasound	Revenue Producing	HOPE
5220 Deleted (11/96)	HOPE Radiology	Revenue Producing	HOPE
5230 Deleted (11/96)	HOPE CT Scan	Revenue Producing	HOPE
5250 Deleted (11/96)	HOPE Pharmacy	Revenue Producing	HOPE
5280 Deleted (11/96)	HOPE Physical Therapy	Revenue Producing	HOPE
5285 Deleted (11/96)	HOPE Occupational Therapy	Revenue Producing	HOPE
5810	HOPE Insurance Expense	Hosp Overhead	HOPE
5830	HOPE Depreciation	Hosp Overhead	HOPE
5880	HOPE Other	Hosp Overhead	HOPE

As a result of suspected inaccurate billing, the Dialysis Unit department head requested an independent audit by a commercial billing service. An audit was conducted for a one month period and a report dated June 1996 was generated. The audit revealed that the Dialysis Unit had not billed (or incorrectly billed) Medicare for \$4,570 of in-house services and had overcharged Medicare \$517 for services not rendered. Audit of CAPD patients receiving treatments at home revealed that Medicare had not been billed for \$18,625 in services.

Projected yearly losses due to billing errors was estimated at \$223,507. This is a large financial loss and indicated procedural changes needed to occur in the processing of data. The auditor concluded that the in-house billing problems were due to charges being transcribed from the grid sheet and not the source sheet (nursing flow sheet). Use of a nursing flow sheet with a carbon copy that would be sent to the secretary upon completion of a treatment regimen was recommended as a solution. Billing problems with CAPD patients who were treated at home were attributed to billing methods of these patients.

The initial interview with the clinical secretary in October 1996 revealed several problem areas. The single nursing flow sheet being used by clinical personnel was required to stay with the patients chart. This was a long standing problem that had been identified in the Plan of Action in March 1995 (see table 1). The secretary was using a grid sheet prepared by nursing staff to input treatment data into the Medipac system. This was causing problems and the secretary would in turn miss charges because the grid sheets, nursing flow sheets or charge sheets were never checked for accuracy.

A revised nursing flow sheet is now in use. This new flow sheet has a carbon copy which solves previous problems with accurate capture of services and provides information that eliminates the need for a charge sheet. Additionally,

treatments, laboratory tests or drugs not specifically related to ESRD are no longer entered into the Medipac system as dialysis related. This has forced the patient billing technician to file separate claims for services not covered under the composite rate, decreasing or eliminating the amount of denied claims.

The most frequently administered drug for Dialysis Unit patients, epogen is very expensive and the cost per treatment typically runs between \$58 and \$290. The use of epogen for a dialysis patient must be justified and is only reimbursed by Medicare if the patient's hematocrit is below a reading of 36. Documentation justifying the use of epogen was not consistently being done or not accomplished in a timely manner which resulted in confusion, subsequent incorrect submission of claims, denials and write-off's.

All treatments, laboratory tests and drugs prescribed for a dialysis patient were supposed to be entered in the nursing flow sheet and on the charge sheet by the nursing staff. The clinical secretary then transcribed this information and entered it into the Medipac and TDS systems. All treatment, laboratory tests and drugs prescribed for each patient were recorded by nursing staff as renal treatments regardless of whether treatment was dialysis related. This resulted in Medicare claim denials because not all treatments, laboratory tests or drugs prescribed were covered by the composite reimbursement rate or were considered

ESRD related by Medicare.

A significant number of claims for laboratory testing submitted to Medicare for reimbursement were being denied. The Dialysis Unit was submitting recurring accounts for all laboratory work for dialysis patients and assigning them with a diagnosis code of anemia. The diagnosis code of anemia was causing the claim denials. To solve this problem, the Dialysis Unit is now using two types of patient accounts for laboratory testing. One account (renal) is for tests associated with ESRD and uses a diagnosis code of anemia. The other account (outpatient) is for tests ordered for any other reason and is labeled with the appropriate diagnosis code.

The interview with the coding technician revealed no apparent problems. The process of coding is to simply match the renal treatment listed on the nursing flow sheet with the correct ICD 9 code and input this data into the Medipac system. Of note, there is very little if any communication between the dialysis clinical staff, the coding technician or patient billing technician which is problematic for the entire billing process. If the coding technician received erroneous data it was inputted as submitted with no method of verification in place.

The interview with the patient billing technician revealed that a significant

number of claims are being rejected by Medicare because they were submitted without proper justification for treatments, procedures, laboratory test or drugs not covered by the Medicare composite rate. Table 5 lists the laboratory tests not included in the Medicare composite rate that must be billed separately for reimbursement.

Table 5, SHGH Renal Dialysis Product Line - Lab Tests not Included in Medicare Composite Rate (As of May 1997)	
Monthly	Hepatitis associated antigen test.
Every three months	Nerve Conduction Velocity test, Serum Aluminum, Serum Ferritin, EKG.
Annually	Bone Survey, Hepatitis B Surface Antibody or Hepatitis B Core Antibody (one but not both).
Vaccines	Hepatitis B Vaccine (3 doses) initial dose, 2nd dose - 1 month after initial dose, 3rd dose -6 months after initial dose.

The following drugs are not covered under the Medicare composite rate, but may be medically necessary for some patients receiving dialysis: antibiotics, anabolics, analgesics, hematinics, muscle relaxants, sedatives, tranquilizers and thrombolytics used to declot central venous catheters. When furnished in the dialysis facility, these items must be billed separately and be accompanied by medical justification.

The billing technician also related that a significant number of Medicare claims are being denied because of improper coding. No effort to resubmit these

claims is being made and the amounts in question are simply being written off. The general consensus is that recovery of these monies would take more effort than it is worth. The technician related that a cost benefit analysis is needed to help management decide whether or not to pursue recovery of these funds. Resubmission of claims would require manpower and time to pull medical records, compose appeal letters, and copy paperwork. There is no mechanism in effect to track the amount of claim denials per fiscal year. An in-depth analysis of the changes in claim denials between FY 95 and FY 97 was unable to be performed due to the lack of sufficient data. Table 6 provides the amounts written off due to claim denials from Medicare.

Table 6, SHGH Renal Dialysis Product Line- Claim Denials	
Fiscal Year	Amount Denied
FY 1995	\$435,872
FY 1996	\$182,940
FY 1997	\$155,008
TOTAL	\$773,820

Occasional audits of the patient billing process have occurred over the past three year period but these audits were performed by departmental personnel and considered superficial. Training between dialysis clinical staff, coding personnel and patient billing is nonexistent and is the cause of many claim denials. Frequent

audits of patient billing procedures would help reduce errors and claim denials by examining the process to ensure proper guidelines and procedures were being followed.

Table 7 uses case mix data to provide a comparison of direct, hospital and full costs associated with the number of cases, total charges, total reimbursement, total cost and total margin. "Direct" cost represents all costs in revenue producing cost centers and departmental depreciation. "Hospital" cost represents Direct plus hospital overhead cost centers. "Full" cost represents fully allocated cost including corporate overhead. Margin is calculated on the various levels of cost. Cases, charges and reimbursement do not change based on the different level of cost. The number of cases equal recurring bills, thus the approximate 100-120 active patients receiving a cycle bill every three months plus turnover and new patients equals 650 "cases" for FY 95, 550 "cases" for FY 96 and 545 "cases" for FY 97.

Table 7, SHGH Renal Dialysis Product Line FY 1995-1997			
FY 1995	Direct	Hospital	Full
Cases	650	650	650
Total Charges	4,242,284	4,242,284	4,242,284
Total Reimbursement	1,990,713	1,990,713	1,990,713
Total Cost	2,435,895	2,934,845	3,175,433
Total Margin	-445,181	-944,131	-1,184,719

Table 7, SHGH Renal Dialysis Product Line FY 1995-1997			
FY 1996	Direct	Hospital	Full
Cases	550	550	550
Total Charges	4,878,936	4,878,936	4,878,936
Total Reimbursement	2,479,746	2,479,746	2,479,746
Total Cost	2,853,765	3,664,951	3,938,315
Total Margin	-374,019	-1,185,205	-1,458,569
FY 1997	Direct	Hospital	Full
Cases	545	545	545
Total Charges	4,736,917	4,726,917	4,726,917
Total Reimbursement	2,987,482	2,987,482	2,987,482
Total Cost	1,911,889	2,216,678	2,413,882
Total Margin	1,075,593	770,804	573,600

Review of case mix financial data reveals that total charges increased by \$636,652 between FY 95 and FY 96 while decreasing by \$142,019 between FY 96 and FY 97. Increases and decreases in total charges are explained by adjustments in charges for services or contractual adjustments. Total reimbursement went up between FY 95 and FY 97 by \$996,769. The increase in total reimbursement can be attributed to a decrease in claim denials (see table 6), billing corrections, rate increases (non-Medicare), and due to miscellaneous factors (i.e., contractual adjustments, reduction of charity cases).

Total cost went up between FY 95 and FY 96 by \$762,882 and decreased

by \$1,524,433 between FY 96 and FY 97. The decrease in total cost can be attributed to direct cost being erroneously reported for FY 96 by approximately \$550,000, misallocation of overhead by \$650,000 and a decrease in total operating expenses by \$324,433.

The significance of the \$1,200,000 error with direct cost and overhead allocation in FY 96 made the renal product line appear to be in more financial trouble than it really was. In reality total margin in FY 96 was approximately - (\$258,569). The positive turnaround for FY 97 can be attributed to improved capture of charges (increased reimbursement), contractual adjustments for non-Medicare patients, and a decrease in claim denials and total costs.

Table 8 provides information on total operating expenses, excess operating revenue expenses, total revenue and salaries for the renal dialysis product line for Fiscal Years 1995-1997. Analysis demonstrates that total operating expenses increased \$155,940 between FY 95 and FY 96 but decreased \$84,385 between FY 96 and FY 97. The decrease in total operating expenses was due to a decrease of insurance expense, reallocation of overhead and a decrease in the amount of total general supplies. Between FY 95 and FY 97 excess operating revenue/expenses increased \$1,630,303, total revenue increased by \$1,786,243 and salaries increased \$49,240. While total operating expenses and salaries have remained

fairly constant over the three year period, revenue has steadily increased. The rise in revenue can be attributed to increases in pricing of services (increase of price per unit of service) and a slight increase of services to CAPD patients who receive treatment at home.

Table 8, SHGH Renal Dialysis Product Line- Revenue & Expenses			
	FY 1995	FY 1996	FY 1997
Total Operating Expenses	\$1,759,045	\$1,999,370	\$1,914,985
Excess Operating Revenue/Expenses	\$1,821,602	\$2,660,207	\$3,451,905
Total Revenue	\$3,580,647	\$4,659,577	\$5,366,890
Salaries	\$621,535	\$665,740	\$670,775

Discussion

The five year plan formulated in 1991 erroneously calculated that the high flux machines would decrease the number of required patient treatments. The high flux machines are operating at designed capabilities and all patients require dialysis treatments of four hours per session, three times per week to maintain the standard of care. The projected profits were not realized because they were based on projected increases in patient volume resulting from the mistaken belief that the high flux machines had enhanced capabilities. However, the purchase of the equipment was warranted to maintain the standard of practice for the Dialysis patients. It was impossible to analyze the financial impact that the purchase of the

high flux machines had on the renal dialysis product line due to the unavailability of case mix data for FY 92 - FY 94.

The Plan of Action formulated by the Dialysis Unit supervisor identified eight problems in March 1995, six had not been resolved in October 1996. Three problem areas were still ongoing in May 1997. Management and Dialysis Unit staff are now aware that the high flux machines are running as designed and that patients still require three dialysis treatments per week. Efforts are being made to resolve all outstanding previously identified problem areas as well as updating the Plan of Action with current operations. Monthly meetings with personnel from all the areas involved with the dialysis process have been implemented to revisit problem areas, discuss current issues and to educate staff.

Assigning a secretary for the Dialysis Unit to be solely responsible for transcribing treatment data into the Medipac and TDS systems coupled with implementing a revised nursing flow sheet solved those problems previously identified in the Plan of Action. The revised nursing form has made it easier to track all treatments and charges. This coupled with the education of nursing staff and laboratory personnel has helped to ensure that all treatment regimens and charges are captured on the nursing flow sheet. Since the initial interview with the secretary all treatments, laboratory tests and drugs ordered are no longer entered

into the Medipac system as ESRD related. If the patient has a comorbid condition that requires treatment, laboratory test or a prescription drug, the secretary transcribes it as a separate entry. This prevents claim denials and aids in proper coding and accurate capture of services for reimbursement.

The financial turnaround between FY 96 and FY 97 revealed a positive change in total margin of \$2,032,169. This significant change can be partially attributed to approximately \$1,200,000 in errors with case mix financial information. Direct cost (\$550,000) and overhead (\$650,000) were erroneously reported. The error with overhead costs (direct, hospital and corporate) occurred because the other departments moving out of the Hope Medical Center in January 1996 and their overhead allocation was then allocated to the Dialysis Unit inappropriately.

The audit of the billing process confirmed the CFO's and department head's suspicions that problems existed with capture of charges. This was also previously identified as a problem area in the Plan of Action in March 1995. The majority of problems identified by the audit were clerical in nature. Most errors were simple transcription errors of treatments, procedures, and drugs not being recorded on the nursing flow sheet or charge sheet. The goal to fully capture all charges has been achieved by the development of a revised nursing flow sheet. This sheet records

all treatments received and eliminates the necessity for using a charge sheet. A carbon copy of the flow sheet provides the clinical secretary an accurate description of patient services rendered. The clinical secretary is solely responsible for inputting data from the nursing flow sheet into the Medipac and TDS systems. This solution to a long standing problem provides a method that ensures accurate capture of all services and eliminates the need for nursing staff to record charges.

Medicare claims denied for laboratory tests or drugs not included in the composite rate, and claims lacking required justification or improper coding resulted in a loss of \$773,820 over a three year period. Recovery of these denied claims was not attempted because the benefit did not appear to be worth expending the manpower required to accomplish this task. A major reason for this belief was that no one really knew how much revenue was being lost due to claim denials. This information was available but not routinely tracked. However, this loss should not occur in the future because of improved clerical and laboratory procedures and staff education.

In reality, the Dialysis Unit only occupied approximately one-third of the Hope Medical Center building and was being charged overhead costs for the entire building as well as some overhead in the new Careplex building. The misallocation of overhead made the renal dialysis product line appear to be losing a significant

amount of revenue. If you subtract the erroneous data, the renal dialysis product line actually had a total margin of -(\$258,569) for FY 96. Prudent management practice has demonstrated a gain in reimbursements while holding costs down resulting in a total margin of \$573,000 for FY 97.

CONCLUSIONS

Based on this study's findings a variety of factors contributed to the financial losses of the Dialysis Unit including: inaccurate reporting of direct cost and overhead, inability to capture charges for all services rendered, claim denials, inadequate follow-up of previously identified problems, flaws with the procedural processes in the submission of claims for reimbursement and lack of staff education. Rising health costs dictate the use of prudent management practices which can be realized in the Dialysis Unit by developing and implementing guidelines for processing claims for reimbursement. Successful application of guidelines, staff education plans, training and teamwork will ensure efficient operation.

Use of clinical guidelines can provide the means to control costs, monitor progress and improve quality. Implementing clinical guidelines for laboratory procedures will provide the necessary tools to meet requirements and eliminate

claim denials for improper justification or coding. Emphasis needs to be placed on developing clinical guidelines for the use of epogen. Use of this high-cost drug must be monitored closely to prevent further loss of revenue.

Alternate methods of administering epogen, such as the use of subcutaneous injection versus intravenous (IV) injection has resulted in significant savings in Veterans Administration Hospitals throughout the country (Department of Veterans Affairs 1991). The Dialysis Unit should investigate the use of the subcutaneous method as a means for cost containment.

Continued use of independent auditors is highly recommended. An audit provides a low cost alternative to see if charges are being accurately captured. Tracking the reason for, and the amount of claim denials should be a priority concern for management. Additionally, frequent review (monthly) of case mix financial data and the number and amount of claim denials is necessary to track progress and identify problem areas.

Providing dialysis service to the residents of the Virginia Peninsula is a valuable and necessary community service--the benefit and value of which is very hard to measure. Genuine concern and commitment by management, the Dialysis Unit staff, coding and billing personnel will ensure the Dialysis Unit is on the road to recovery!

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